Bergoust's trajectory on the moon has the same size and shape as his trajectory on Earth.

Proof: Suppose that Bergoust skis down two identical slopes—one on Earth and the other on the moon. He begins his run at the same place on both slopes. His velocity at the bottom of the moon slope, v_m, is related to his velocity at the bottom of the Earth slope, v_E, by equation (1):

$$v_m = v_E (g_m/g_E)^{1/2} \quad \text{equation (1)}$$

where g_m = gravitational acceleration on the moon;
g_E = gravitational acceleration on Earth; and
g_m/g_E = 1/6.

His moon velocity is less because lunar gravity pulls him downslope at a more gradual pace.

He then shoots up the kicker and follows a ballistic arc through the "air." The height of his ballistic trajectory, according to Newton's laws of motion, is simply

$$H = v^2 \sin^2(\theta)/2g$$

where   H = the height of the arc
θ = the angle of the kicker.

We can compare the trajectory's height on Earth, H_E, vs. the height on the moon, H_m.

$$H_E = v_E^2 \sin^2(\theta)/2g_E \quad \text{equation (2)}$$
$$H_m = v_m^2 \sin^2(\theta)/2g_m \quad \text{equation (3)}$$

Combine equations 1-3:

$$H_E/H_m = (v_E^2/v_m^2) \cdot (g_m/g_e) = 1$$

They are the same!

We can do a similar calculation for the range, R, of his trajectory. According to Newton,

$$R = v^2 \sin(2\theta)/g.$$

$$R_E = v_E^2 \sin(2\theta)/g_E \quad \text{equation (4)}$$
$$R_m = v_m^2 \sin(2\theta)/g_m \quad \text{equation (5)}$$

Combine equations 1, 4 and 5:

$$R_E/R_m = (v_E{}^2 / v_m{}^2) \cdot (g_m/g_e) = 1$$

Like the height, the range is the same on both worlds.

Caveat emptor: This analysis ignores effects such as air resistance on Earth, which is absent on the moon, and the possibility that moondust is much rougher than snow, which might invalidate to some degree equation (1). But if these simplifications are accepted, we can see that the moon trajectory looks identical to its Earthly counterpart. The skier merely traces the arc more slowly on the moon.

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